COMMONWEALTH OF AUSTRALIA

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Warning

CHARLES DARWIN UNIVERSITY

Family Name	
Given Names	
Student Number	
Teaching Period	Semester 1, 2016

FINAL EXAMINATION	**DURATION**
SBI282 – Clinical Microbiology 1	Reading Time: **10** minutes Writing Time: **180** minutes

INSTRUCTIONS TO CANDIDATES

The examination has **three** sections

Section A: Multiple Choice Questions, Suggested Time: 40 minutes, Answer ALL (30) questions

Section B: Short Answer Questions, Suggested Time: 60 minutes, Answer 15 of 15 questions

Section C: Short Essay Questions, Suggested Time: 50 minutes, Answer 3 of 3 questions

Section A must be answered on the Multiple Choice Answer sheet provided and must be handed in with your answer booklet. Please ensure that your name and student number are clearly indicated on your Answer Sheet and at the top of this examination paper.

Section B and Section C are to be answered in separate booklets.

Read ALL questions carefully.

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

No dictionaries are permitted

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 20 Page Book 2 x Scrap Paper Faculty/School Multiple Choice Answer Sheet

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

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Section A

Multiple Choice Questions

Total No of Marks for this section: thirty (30)

This section should be answered on the Multiple Choice Answer Sheet provided. Please ensure that your name and student number have been written on the Answer sheet and place in the completed answer Booklet.

Each question is worth 1 mark. Suggested Time allocation for Section A: 40 mins

Section B
Short answer
Total Number of marks for this section: Sixty (60)

This section should be answered in the Answer Booklet provided.
Questions are **NOT** of equal value see each question for mark allocation. Suggested Time allocation for Section B: 60 mins

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Question 1
Why do many Gram-positive microbes that grow on the skin, such as *Staphylococcus epidermidis*, grow poorly or not at all in the gut?

(Marks: 2)

Question 2
Provide one example of how negative staining is used in a clinical setting?

(Marks: 2)

Question 3
To presumptively identify *Mycobacterium* what type of agar plate would you culture the organism on? Identify what type of agar this plate this is, and describe the characteristic appearance of this organism. (Marks: 4)

Question 4
What is an F factor, and how does it (and other factors like it) contribute to gene exchange?

(Marks: 2)

Question 5
What are the key features of a MacConkey agar plate which make it a useful differential agar plate? Name and describe the appearance of exemplar species.

(Marks: 6)

Question 6
Name the major causes of bacterial meningitis and the two routes of infections

(Marks: 5)

Question 7
Why is penicillin not very effective against Chlamydia? What antibiotic can be used to treat this disease?

(Marks: 2)

Question 8
Please insert the letter which most accurately fills in the blank space to make a correct statement.

(Marks: 10)

A.	*Staphylococcus aureus*	_____ 1. _____ is a common cause of
B.	*Staphylococcus epidermidis*	subacute bacterial endocarditis (SBE),
C.	*Streptococcus agalactiae*	and a less common cause of cystitis.
D.	*Streptococcus pneumoniae*	_____ 2. Certain strains of _____ are
E.	*Streptococcus pyogenes*	the so-called flesh-eating bacteria.
		_____ 3. _____ is a common cause of bacterial pneumonia, meningitis, and otitis media.
		_____ 4. _____ is the most common cause of toxic shock syndrome.
		_____ 5. _____ is one of the most common causes of neonatal meningitis.
F.	Bubonic plague	_____ 6. *Borrelia burgdorferi*
G.	Gas gangrene	_____ 7. *Treponema pallidum*
H.	Lyme disease	_____ 8. *Clostridium perfringens*
I.	Syphilis	_____ 9. *Yersinia pestis*
J.	Whooping cough	_____ 10. *Bordetella pertussis*

Question 9
Give two examples of strict pathogens and opportunistic pathogens, respectively.

(Marks: 4)

Question 10
Please choose the most reliable diagnosing method for *Clostridium difficile* disease from:

a. Gram stain of the stool
b. Culture of the stool for *C. difficile*
c. PCR assay for toxin gene in stool

and explain the reason.

(Marks: 4)

Question 11
Botulism toxin can be used as an antidote for tetanus. Can tetanus toxin be used as an antidote for botulism? Why or why not?

(Marks: 4)

Question 12
Which blood based agar is more likely to grow a fastidious organism? Why?

(Marks: 2)

Question 13
Different bacteria require different bacterial environments to grow. Name, define and provide one example for three different atmospheric incubation environments used in a clinical environment.

Name (condition)	**Environmental conditions**	**Bacterial species example**

(Marks: 9)

Question 14

Using specific examples, explain the concept of "infectious dose".

(Marks: 3)

Question 15

How is gas production observed in a TSI slant?

(Marks: 1)

Section C
Short Essay Questions
Total Number of Marks for this section: Thirty (30)

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested Time allocation for Section C: 50 mins

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Question 1

Many species of bacteria are responsible for food poisoning. List five species with a brief description of typical symptoms each of them cause.

(Marks: 10)

Question 2

Design a summary figure of a bacterium that illustrates the common targets of antimicrobial therapy. Explain the basic mechanisms of antibiotic actions against those targets.

(Marks: 10)

Question 3

Describe the process of identification to differentiate *Staphylococcus aureus* from other *Staphylococcus* species, making sure to comment on the range antibiotic sensitivity patterns commonly observed.

(Marks: 10)